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RESPONSE EFFICIENCY DURING FUNCTIONAL COMMUNICATION TRAINING: EFFECTS OF EFFORT ON RESPONSE ALLOCATION

DAVID M. RICHMAN, DAVID P. WACKER, AND LISA WINBORN

THE UNIVERSITY OF IOWA

An analogue functional analysis revealed that the problem behavior of a young child with developmental delays was maintained by positive reinforcement. A concurrent-schedule procedure was then used to vary the amount of effort required to emit mands. Results suggested that response effort can be an important variable when developing effective functional communication training programs.

DESCRIPTORS: functional analysis, functional communication training, aggression, concurrent schedules, mands, developmental disabilities

Functional communication training (FCT) has been shown to be an effective treatment for problem behavior across a wide range of topographies, client characteristics, and settings (Wacker et al., 1998). One important component of FCT that has received relatively little attention in the research literature is the property of the mand selected to replace problem behavior. Horner and Day (1991) conducted an investigation that evaluated the effectiveness of an FCT package when the participant was required to sign a full sentence (high effort) versus one word (low effort). Results indicated that low rates of problem behavior maintained by negative reinforcement occurred only with the low-effort mand. These results suggest that the efficiency of manding may have important implications for FCT programs. The purpose of the current study was to replicate the effects of response efficiency described by Horner and Day and to extend these results by documenting the effects of response efficiency on behavior maintained by positive reinforcement.

METHOD

Mike was a nonvocal and ambulatory 3-year-old boy who had been diagnosed with pervasive developmental disorder. He was admitted to a specialized inpatient unit for assessment and treatment of aggression. Mike's mother conducted all assessment and treatment sessions with coaching from inpatient therapists. The dependent variables were (a) aggression, which consisted of striking his mother with his fist or open hand; (b) handing his mother a communication card (10 cm by 10 cm); and (c) signing "please." Although Mike did not emit recognizable words at the beginning of this analysis, he began saying "please" after Session 21 of the concurrent-schedule assessment. Mike typically said "please" while he signed "please," but only one mand was scored when he simultaneously verbalized and signed "please." A 6-s partial-interval recording system was used to collect data during the functional analysis, and a count within partial-interval recording system was used to record discrete occurrences of independent mands and aggression during the concurrent-schedule procedure. Interobserver agreement was collected during 26% of the sessions distributed evenly across conditions. Mean interobserver agreement was 89% (range, 84% to 100%).

A series of four analogue functional analysis conditions (free play, attention, tangible, and escape) were conducted using a multielement design (see Wacker et al., 1998, for

a procedural description of conditions). Four to 22 5-min sessions were conducted daily.

The mand analysis was a fixed-ratio concurrent-schedule assessment (Timberlake, 1977) that was conducted within a reversal design. During a two-phase mand analysis, a series of 5-min concurrent-schedule conditions were conducted immediately following the functional analysis to study response allocation to two novel mands that required different amounts of physical effort to emit but produced the same functional reinforcer (e.g., access to toys). Phase 1 compared the use of a communication card to aggression, and Phase 2 compared the use of the communication card to signing "please."

Use of the communication card required the following components: (a) orienting and moving toward the card, (b) picking up the card from the floor and orienting towards his mother, and (c) moving to within 30 cm of his mother and placing the card in her hand. Signing "please" required Mike to orient towards his mother and bring his hand up to his chest to sign "please." We hypothesized that using the communication card required more physical effort than signing "please."

During Phase 1 (card vs. aggression) Mike was provided with 30-s access to toys contingent on either aggression or handing his mother the communication card. For all subsequent conditions during the mand analysis, he was provided 30 s of access to the toys, and then access to the toys was restricted until he exhibited aggression or one of the mands. During the second condition (aggression), reinforcement was provided only for aggression (i.e., the card was removed) to test whether aggression was still sensitive to tangible reinforcement. The third condition replicated the first condition.

During Phase 2, three conditions were conducted to determine whether presenting the communication card or signing "please" functioned as the more efficient response. In the first condition (signing "please" vs. card) Mike was provided with reinforcement for signing "please" or handing his mother the communication card. During this condition, aggression was placed on extinction, but aggression did not occur during Phase 2. In the next condition ("please" vs. aggression) access to reinforcement was provided contingent on either signing "please" or aggression. The final condition of Phase 2 repeated the first condition.

The immediacy of reinforcement, the length of history associated with each mand (both were novel mands), the quality of reinforcement (same toys), and the amount of reinforcement (30 s) were all held constant during Phases 1 and 2. No formal mand training was conducted for the communication card or signing "please," but prior to each session, a verbal description and a visual model of the contingencies were presented to Mike by the therapist (e.g., "Mike, you can either sign 'please' or hand the card to your mom to get your toys").

RESULTS AND DISCUSSION

Results of the functional analysis indicated that Mike's aggression (Figure 1) was positively reinforced by access to preferred toys. Access to parental attention was shown to be intermittently involved in the maintenance of aggression.

During the first condition of the mand analysis (Figure 1), responding was primarily allocated to the communication card rather than to aggression. In the second condition, when access to tangible items was provided only for aggression, aggression increased. We again provided access to toys contingent on the use of either the communication card or aggression, and responding was primarily allocated to the communication card. These results suggest that the card response was emitted more than aggression and that both were maintained by tangible reinforcement.

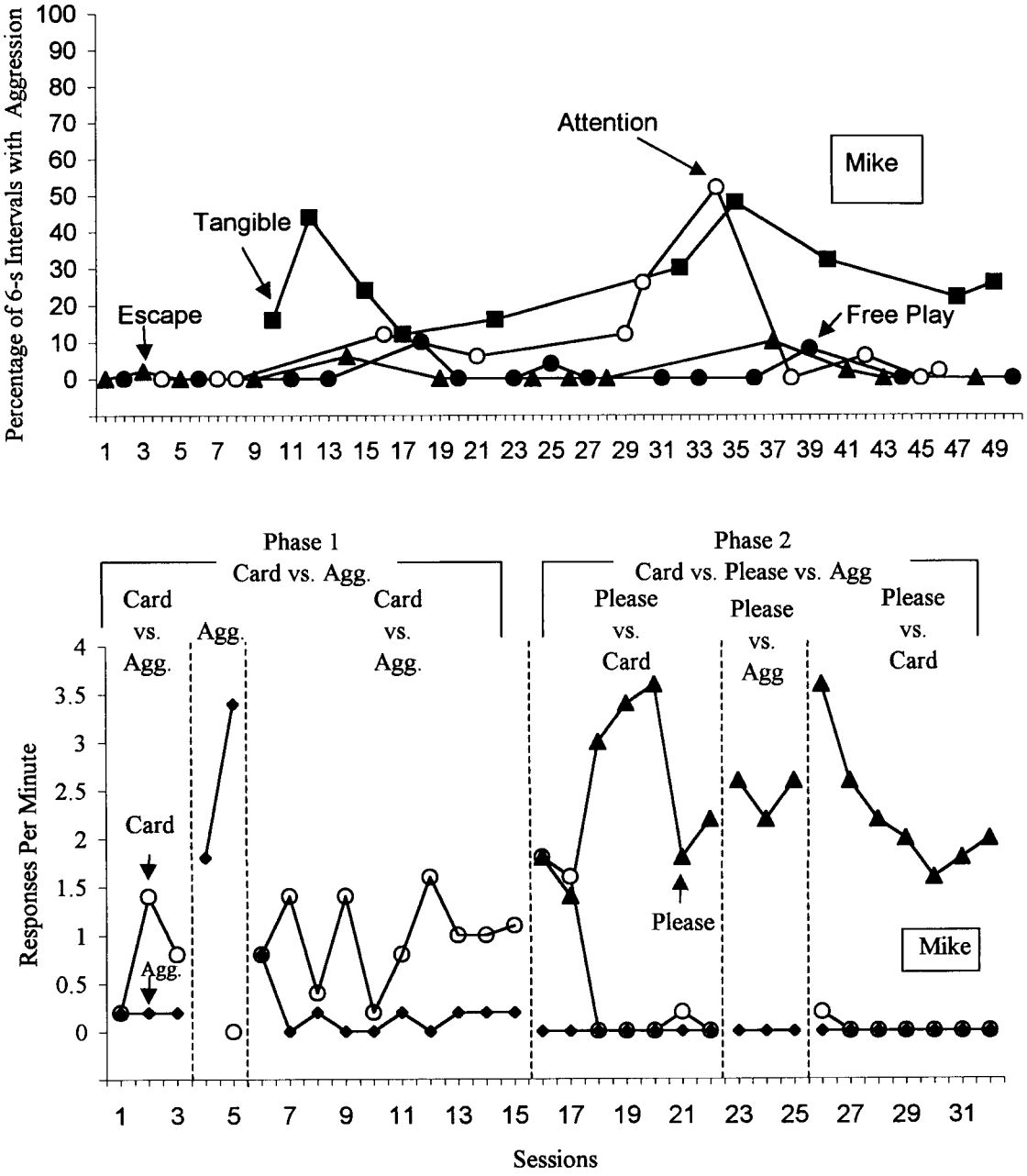

Figure 1. Top panel depicts the percentage of 6-s intervals with aggression during Mike's functional analysis. Bottom panel depicts responses per minute of aggression and manding (card or "please") during the mand analysis.

Results of the first condition of Phase 2 indicated that responding was almost exclusively allocated to signing "please" during the final five sessions. These results suggest that "please" was the most efficient response. Responding continued to be exclusively allocated to signing "please" when reinforcement was provided contingent either on aggression or signing. We then repeated the concurrent-schedule analysis of card versus

signing "please," and responding was allocated almost exclusively to signing. Aggression did not occur during Phase 2. Overall results suggested that signing "please" was a more efficient response than either aggression or the communication card for obtaining toys. However, the primary limitation of the study is that response effort for each mand and aggression was not quantified, but was only judged qualitatively.

These results provide a replication and extension of Horner and Day's (1991) demonstration that response efficiency is an important variable when replacement of problem behavior with a mand during FCT is attempted. Specifically, if problem behavior and mands are viewed from a concurrent-schedule perspective, dimensions of both reinforcement and properties of the mand will influence response allocation. The current study extends this line of research by documenting the effects of response effort on concurrent fixed-ratio schedules of positive reinforcement (Timberlake, 1977).

At least in some cases, aggression can be conceptualized as more effortful than either a communication card or signing "please." This suggests that maintenance of manding may be affected by the amount of effort required to emit mands during FCT packages. If an FCT package includes a mand that is as effortful or requires more effort (is less efficient) than problem behavior, the probability of the individual displaying the mand to obtain reinforcement over a sustained period of time will likely be decreased. As research continues to expand our understanding of response allocation under concurrent schedules of reinforcement, this knowledge base should allow practitioners to design more effective and durable treatment programs.

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